SHORT ARTICLES

CLINICAL COMPARISON OF GLUCOSE BROTH WITH NUTRIENT BROTH BLOOD CULTURES FOR THE DETECTION OF “*STREPTOCOCCUS VIRIDANS*” BACTERAEMIA

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SUMMARY. Viridans streptococci were isolated from the blood stream of half of 50 patients undergoing dental extractions approx. 2 min before blood culture. Glucose and nutrient broths were tested in parallel. There was no significant difference between the isolation rates of streptococci by the two methods after incubation for 7 days, nor did the addition of glucose 0.1% to nutrient broth significantly increase the speed of detection of streptococci; the isolation rates of streptococci during the first 48 h of incubation were similar with both types of broth. Although there were a few more isolations of streptococci from the glucose broth than from the nutrient broth during the first 20 h, the difference was not statistically significant. No rapid lethal effect against streptococci was observed in glucose broth during incubation for 7 days. These results suggest that adding glucose 0.1% to nutrient broth for blood culture does not influence the recovery of organisms from patients with “*Streptococcus viridans*” bacteraemia after incubation of the broth for 2–7 days.

INTRODUCTION

Optimal blood culture techniques are important for the microbiological diagnosis of endocarditis but data on the comparative ability of different media to yield growth of the main causative organisms are lacking. “*Streptococcus viridans*” is still the commonest cause of endocarditis (Lowes *et al.*, 1982; Oakley and Darrell, 1982) and, characteristically, patients with endocarditis caused by this organism have only a low grade bacteraemia. It is impossible to perform worthwhile clinical trials of different blood culture media on patients with streptococcal endocarditis because there are too few cases in any one hospital. However, the streptococcal bacteraemia associated with dental extractions is predictably of low grade and we have performed a clinical trial of two blood-culture media with patients undergoing dental extraction. This paper reports the effect of adding glucose 0.1% to nutrient broth on the recovery of viridans streptococci from post-extraction blood samples.

MATERIALS AND METHODS

Collection of blood samples and inoculation of blood culture media. Blood samples were collected from 50 subjects approx. 2 min after dental extraction; 5 ml of blood was added at the bedside into each of four blood-culture bottles. Two bottles (c and d) each contained 10 ml of nutrient broth with liquoid 0.05% in McCartney bottles. The other two bottles (a and b) were identical with the first pair except that glucose 0.1% was added to the broth. The liquoid-nutrient broth was prepared according to the method recommended in the Association of Clinical Pathologists' broadsheet (Stokes, 1974). Glucose broths were prepared by adding 0.1 ml of a sterile solution of dextrose (Code SR11, Oxoid) 10% in distilled water to each 10 ml of

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Identification of isolates. Isolates were characterised by standard methods. Alpha- or non-haemolytic gram-positive cocci that were resistant to optochin, catalase- and coagulase-negative, and failed to hydrolyse aesculin in a medium containing 40% bile, were identified as viridans streptococci unless Lancefield grouping by the Streptex® test (Oxoid) suggested the presence of a Lancefield Group D streptococcus. Most of the isolates were α -haemolytic. Some strains isolated from mixed growths were further identified by the API 20 streptococcal identification test (API System).

Results of glucose broth and nutrient broth blood cultures collected from 25 patients with post-extraction bacteraemia

the two media. The difference on day 1 was not statistically significant ($p > 0.05$). Streptococci were isolated after incubation for 6 h from only one patient (case no. 5), from whom all four bottles were positive at this time. When mixtures of streptococci were encountered there was no clear difference between the two types of medium in the numbers of strains isolated.

DISCUSSION

Glucose broth is one of the most commonly used blood-culture media and 0.1% is a concentration of glucose that is widely used. There was no previous comparison of the performance of a blood-culture broth containing glucose 0.1% with nutrient broth for the isolation of streptococci from patients with bacteraemia. Viridans streptococci metabolise glucose and it was thought that the addition of glucose might promote the growth of these organisms in blood cultures. However, adding glucose 0.1% to nutrient broth did not significantly improve the isolation rate of streptococci in the present study either during the first 48 h or after incubation for 7 days; 20 cases were detected with nutrient broth and 18 cases with glucose broth. The addition of glucose to nutrient broth is not recommended for blood culture by some authorities because of the risk of rapid bacterial death associated with the change in pH brought about by fermentation (Waterworth, 1972; Stokes and Ridgway, 1980). At the concentration (0.1%) used in this study, there was no apparent increased killing of organisms associated with the addition of glucose during the 1 week that the broths were incubated. Further studies with bacteraemia caused by other species would be of interest but the present study indicates that the addition of glucose 0.1% to blood culture broths does not improve the recovery of viridans streptococci from blood.

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